ACNET and Shot Setup

- **ACNET**
  - navigation, plotting data, recording downtime
- **Shot Setup**
  - Terminology & Overview
  - Checklist & flowchart

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Ace Training
June 18th 2003

ACNET

- What is ACNET ?
- How to start/run ACNET.
- Navigating in ACNET.
- Plotting data in ACNET.
- Downtime logger

What is ACNET ?

- Accelerator Network
- Developed by the FNAL Controls Group
- Monitor information throughout the accelerator
  - Beam currents
  - Luminosity
  - Losses
- Separate devices for Tevatron, Main Injector, experiments

- Runs on VAXes (!) and can create a virtual console on machines running X-Windows.
- If interface seems unusual, it might have to do with the fact that ACNET is about the same age as younger ACEs.
- There is an ACNET console in first floor counting room if you want to practice. Do NOT experiment outside of CDF procedures. It is possible to turn off the TEV from ACNET.
- ACNET consoles are physically connected to a Beams Division network.

Starting ACNET

- ACNET runs on PCs on the West side of the Control Room – racks 2RR03G and 2RR05B – and in 1st floor counting room.
- Should already be running
- Automatically starts after reboot
- If it crashes or is unresponsive, do this get it going again:
  - START
    - Programs
    - Acnet
    - Cnsrun

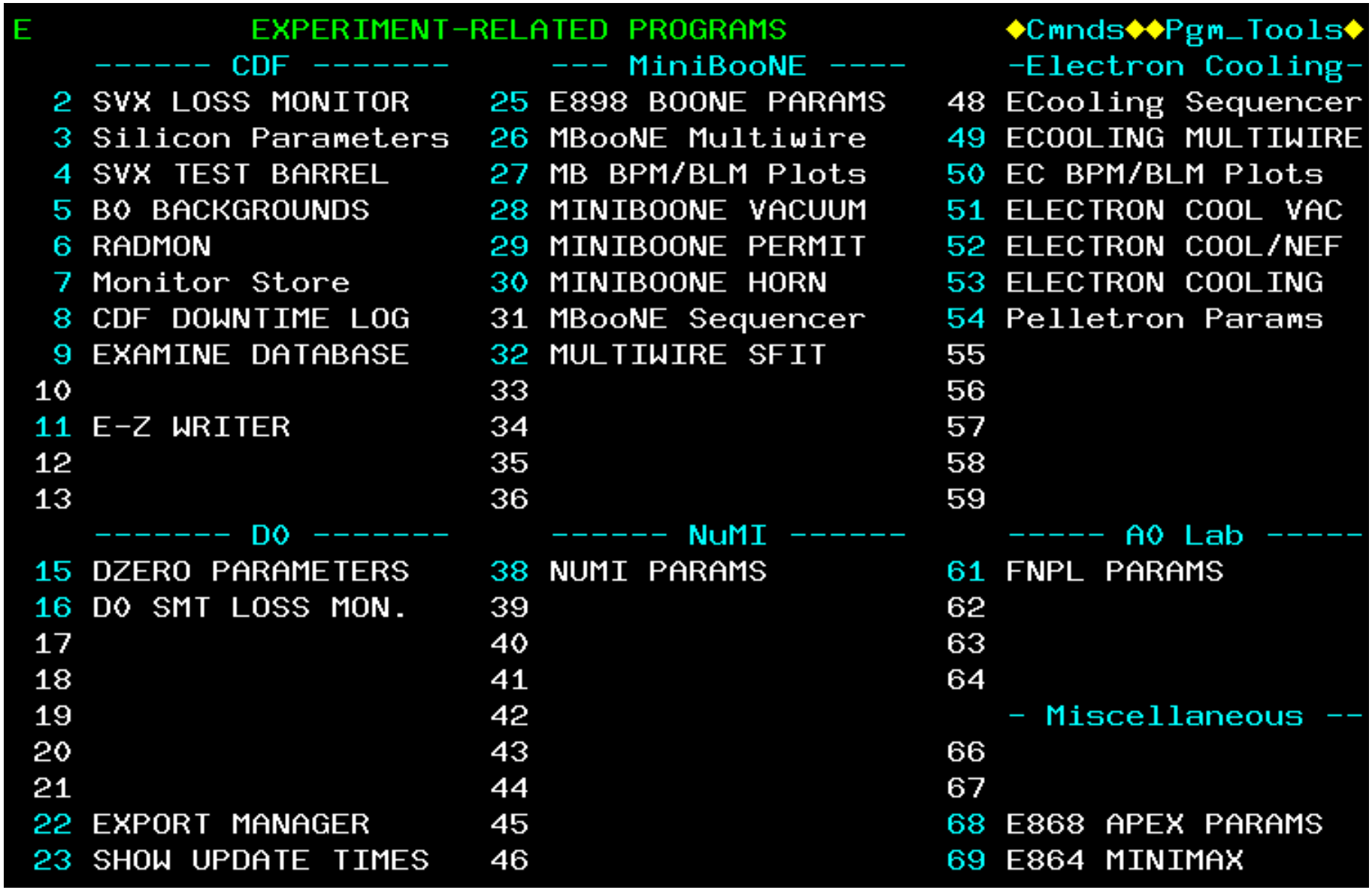
3 sets of 5 windows

- PA – Primary Applications
- PA: Touch Panel
- GxSA – Secondary Applications
- GxPA:1 – Graphics Window
- GxPA:2 – Graphics Window

3 Groups – A, B, C

Additional Utilities Window

Primary Applications Window



Navigating in ACNET

- You will type wherever the cursor is.
- Move the cursor over the character where you want to type.
- Left mouse button works like "return" (text changes color).
- On index page, either click on the page number, or type in Top Left Corner.
- To get back to the index page, type letter of desired index page in the Top Left Corner.

Many Index Pages

B – Booster
C – Collider
D – Diagnostic/Utility
E – Experimental
I - Main Injector
L – Linac
P - PBar
R – Recycler
T - Tevatron

Some Useful and Essential Pages

- C65 Collider Luminosity
- D44 Lumberjack Plotter
- E8 Downtime Data Logger
- E11 E-Z Writer – great for making livetime plots
- E2 SVX Loss Monitor
- E6 Silicon Radiation Monitoring
- E7 Monitor Store

C65 - Collider Luminosity

```
C65  LUMINOSITY/LOSS TOTALS          SET      D/A    A/D  Com-U ◆COPIES◆
-<FTP>+ *SA◆ X-A/D   X=TIME      Y=C:B0PLOS,C:B0ALOS,C:LOSTP  ,C:LOSTPB
COMMAND ---- Eng-U   I= 0         I= 0        , 0        , 0        , 0
-< 1>+  One+ AUTO    F= 1200      F= 50000    , 50000    , 50000    , 50000
 C:B0PLOS      B0 Proton Losses                              2771    Hz
 C:B0ALOS      B0 Antiproton Losses                          173.2   Hz
 C:B0ILUM      B0 Luminosity                                 18.98   E30
 C:B0TLUM      B0 Integrated Lum E                           524.4   nb-1
 C:B0LLUM      B0 Live Luminosity                            18.71   E30
 C:B0TLIV      B0 Live Luminosity Total                      474.5   nb-1
 C:B0C13       Tight Min Bias Trigge                      509905     Hz
 C:B0PAGC      Proton Abort Gap coin2/4                      93.68   HZ
 T:STORE       Present Store Number            2694        2694

 !D0FLTL AND D0FZTL ARE EQUIVALENT (MDC 4/25/01)
 C:D0FLTL      D0 total Fast Z Lum  17.44     17.43       17.43   E30
 C:D0FZTL      D0 total Fast Z Lum  17.44     17.43       17.43   E30
 C:D0PHTL      D0 total prot bunch  41051     41037       41037   Hz
 C:D0AHTL      D0 total pbar bunch  2895      2888        2888    Hz
 !LUMINOSITY AVG
 C:LUMAVG      Average Luminosity                          18.2    E30
-C:FBIANG      TFBI Pbar NaroGate Inten         0         575.2   1E09
 C:LOSTP       CDF LOST PROTONS                            5923      hz
 C:LOSTPB      CDF LOST PBARS                             -51.56     hz
```

Important quantities to Monitor/Plot in ACNET

Losses

C:B0PLOS, C:LOSTP - B0 proton losses
C:B0ALOS, C:LOSTPB- B0 anti-proton losses
C:B0PBSM - Proton Abort gap rate
C:B0ABSM - Anti-Proton abort gap rate
C:B0RAT4 - Abort gap gated losses in CMP

Tevatron

T:ERING - Tevatron energy
T:L1COLI - Tevatron Electron Lens Current
T:RFSUM - Tev RF current
T:SBDMS - Avg. Longitudinal Bunch Length
T:RFSUMA - Anti-Proton RF Sum

Luminosity

C:B0ILUM - B0 instantaneous luminosity
C:B0LLUM - Live instantaneous luminosity
C:B0TLUM - Integrated luminosity
C:B0TLIV - Live integrated luminosity
C:B0Q5 - Current in B0 quads

SVX

E:SVRAD(0-3)
E:SVBLA(0,1), SVBLB(0,1)

www-cdfonline.fnal.gov/acnet/acnetplots.html
www-cdfonline.fnal.gov/acnet/definitions.html

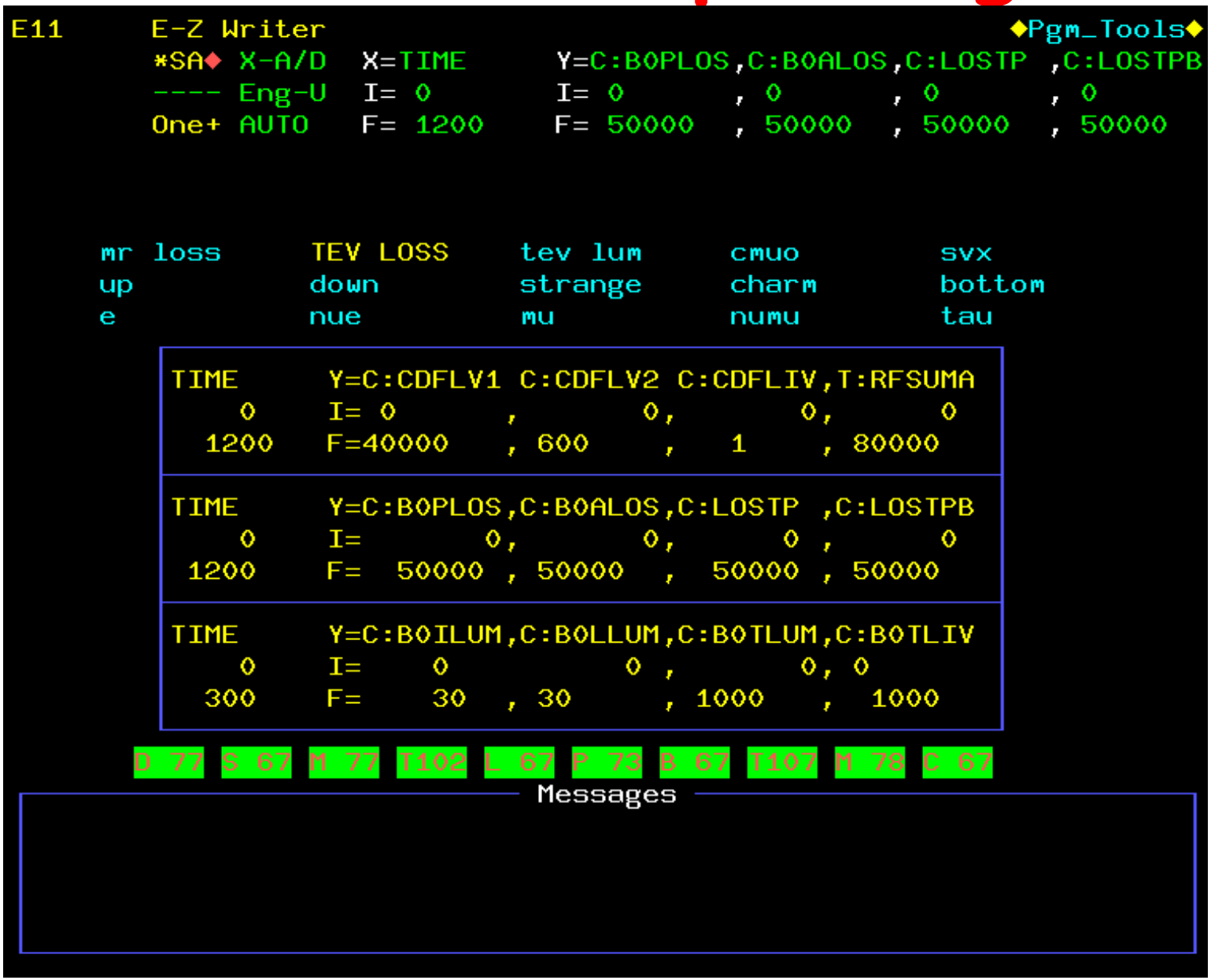
Plotting Data

Two ways to plot

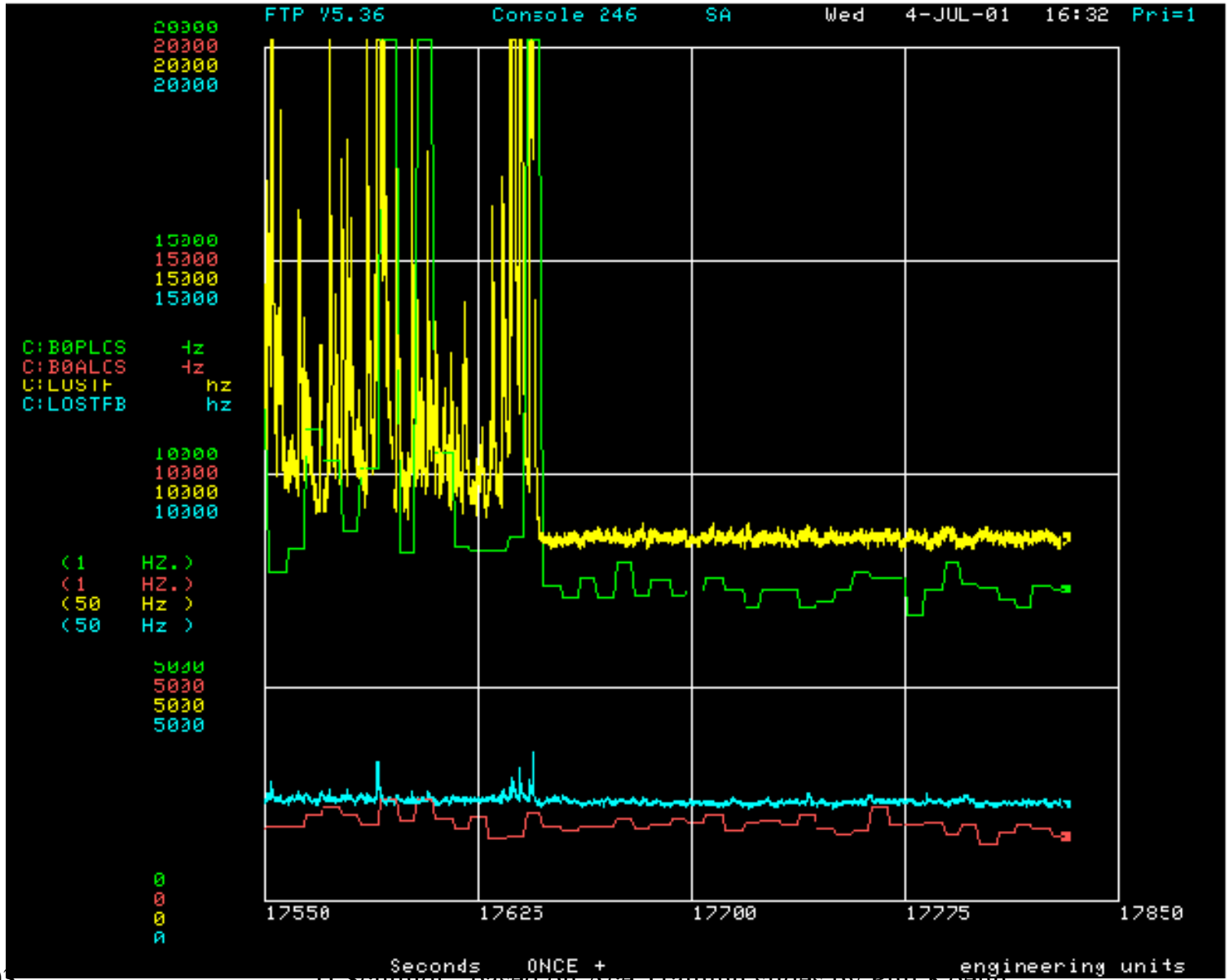
- Real-time plots
  - Fast-time plotter
  - Accessible from E-Z Writer E11

- Plots of stored data
  - Lumberjack data logger
  - Plot from page D44
  - Devices listed on page D43
  - X = Time, Y = Device value

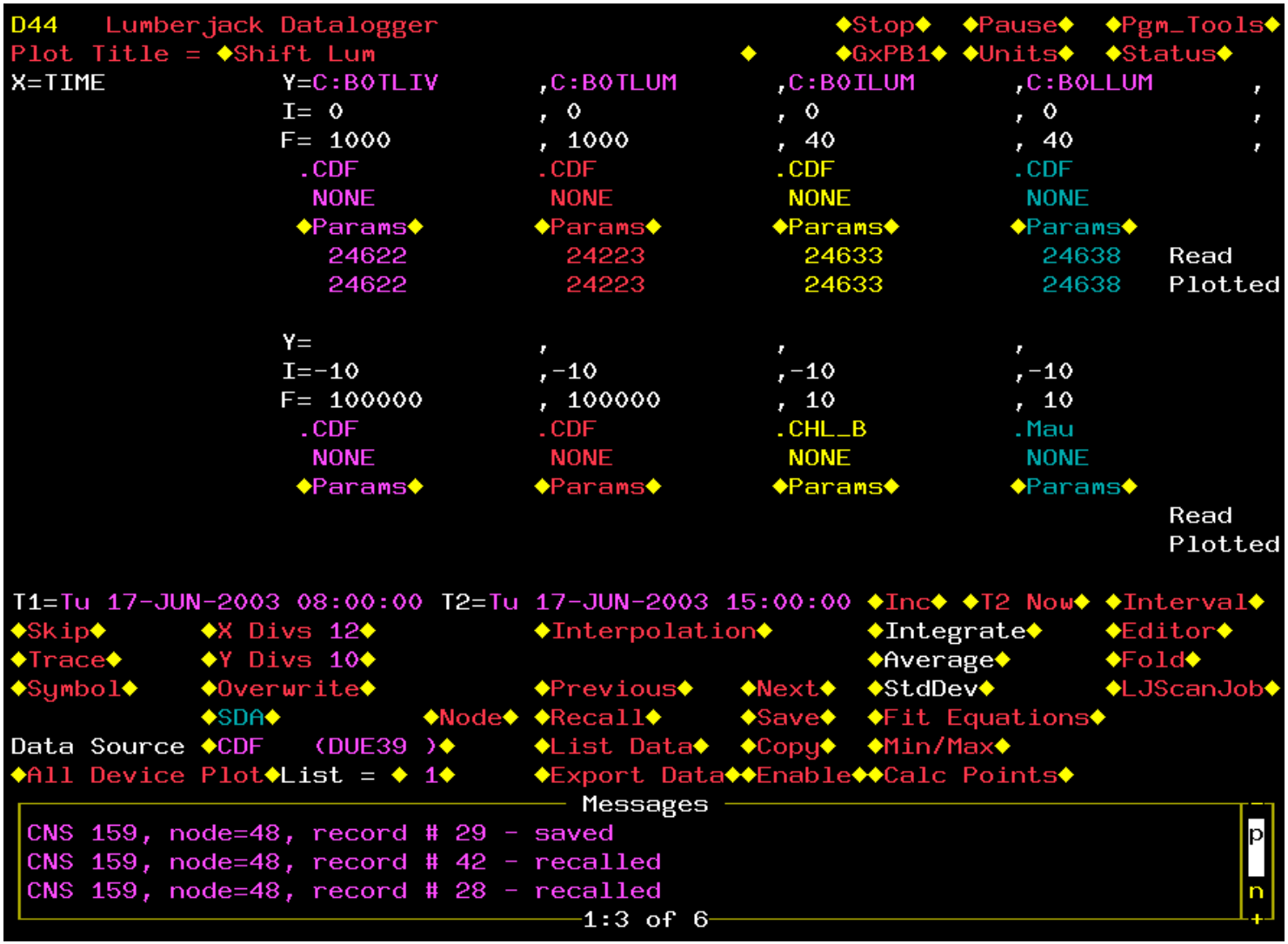
Real time plotting



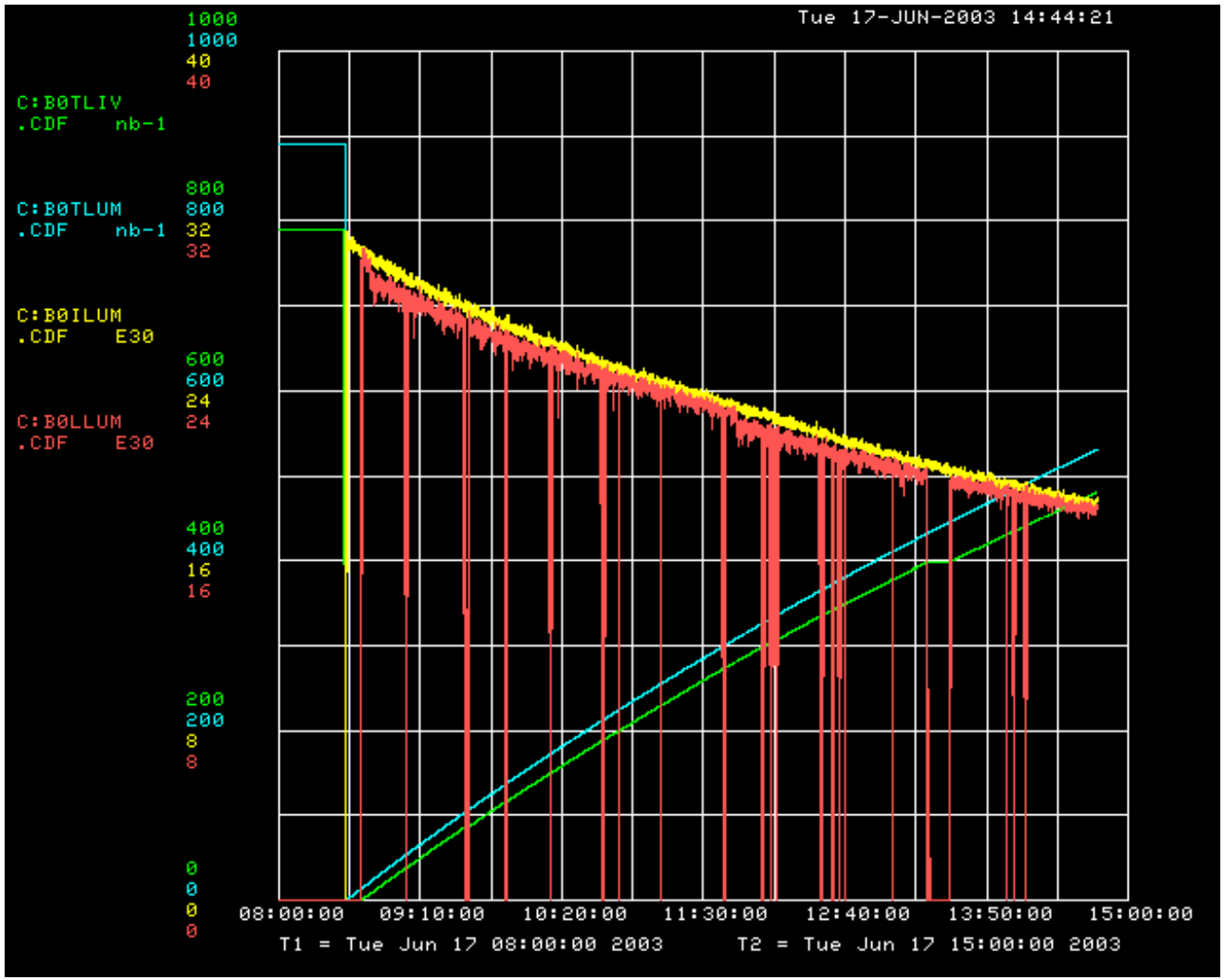
Real time plotting



Plots of stored data
D44: Lumberjack Datalogger



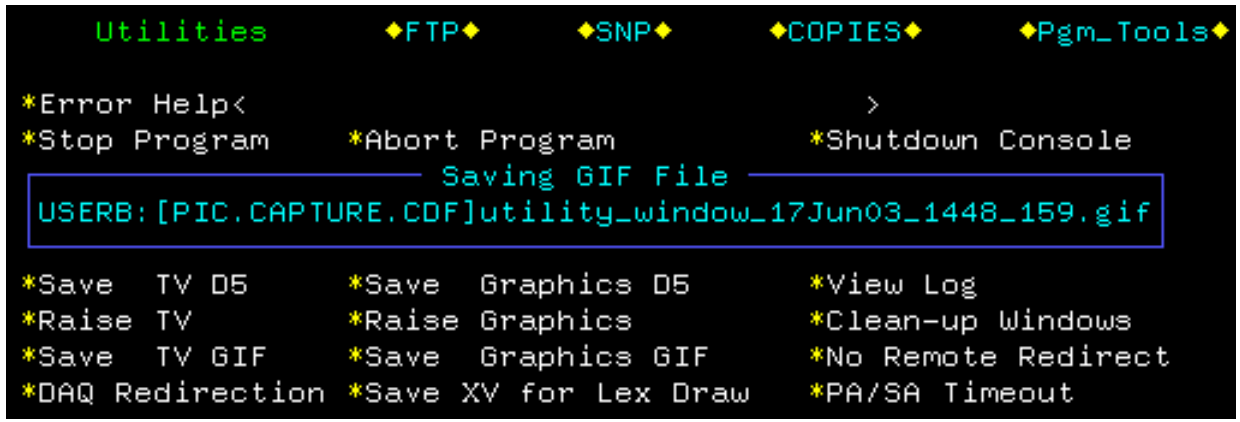
Plots of stored data
D44: Lumberjack Datalogger



End of shift summary

Want summary of luminosity, svx rads in e-log

- Should have lumberjack plots already formatted
- Use RECALL to bring up saved format
- Save file to disk (save as gif)
  - Use utilities window

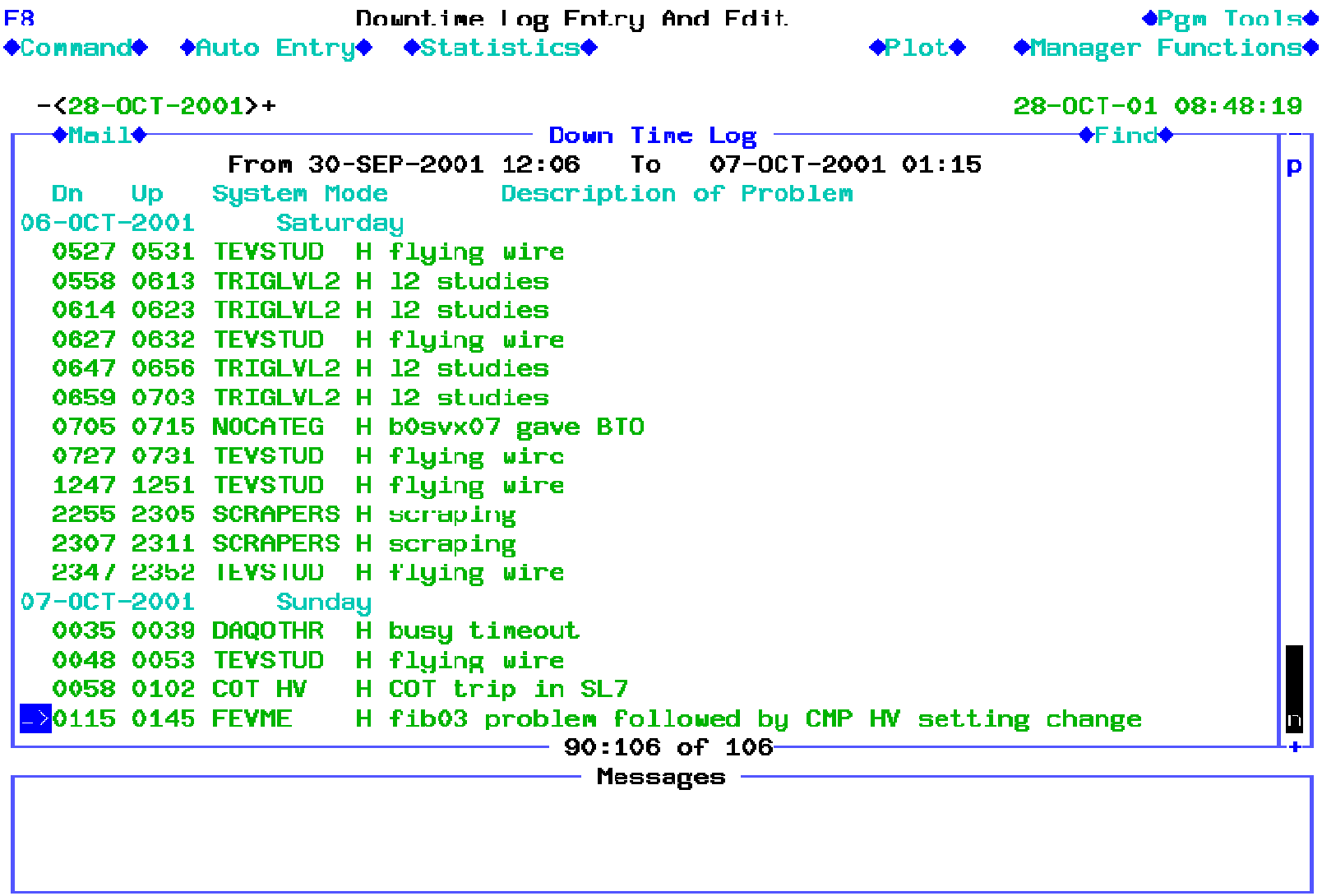


  - Save to gif
  - Save in [PIC.CAPTURE.CDF]
- Import to e-log

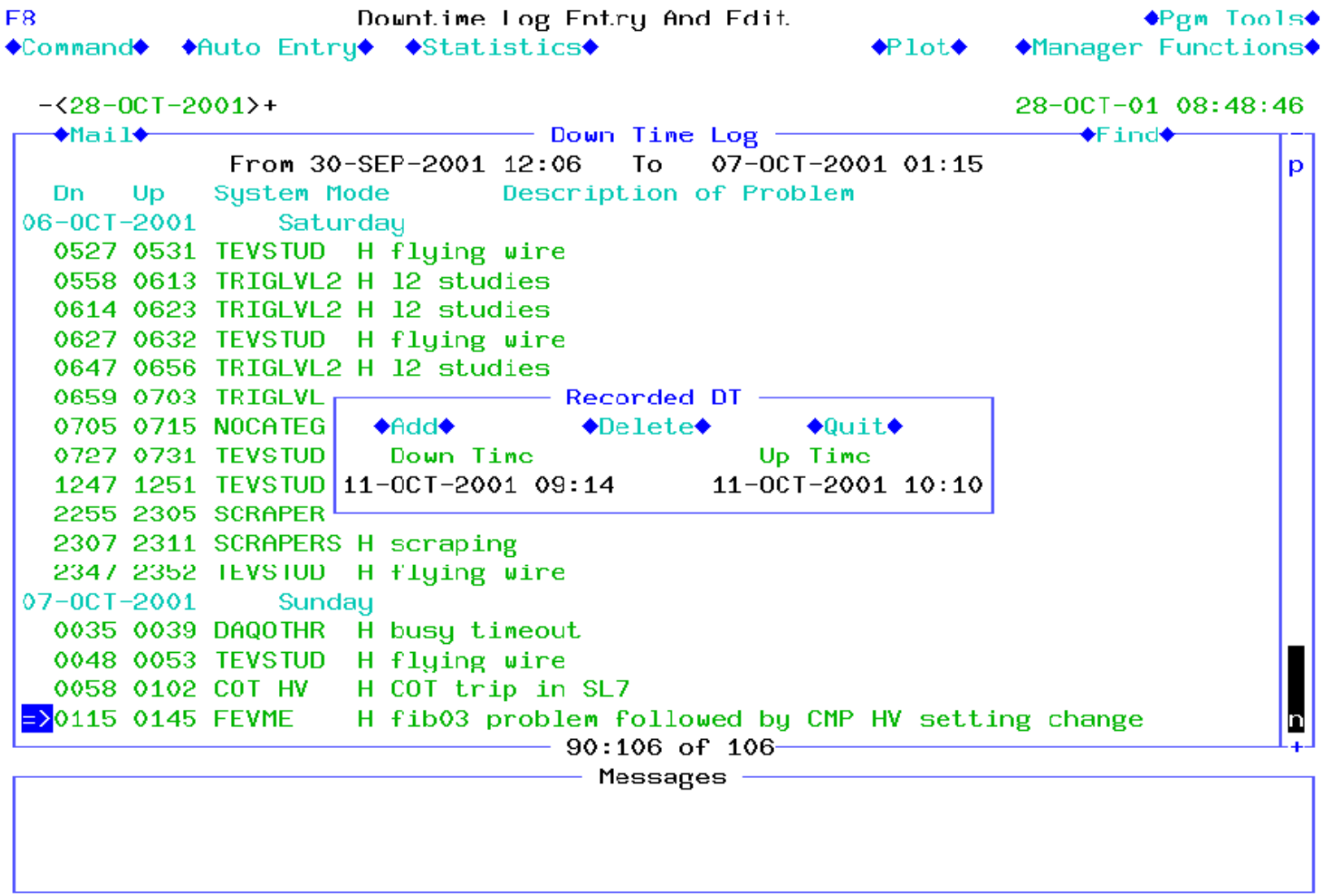
Page E8 - CDF Downtime data Logger

- When data-taking stops for more than 2 minutes, an entry is generated automatically.
- Shift crew must edit to categorize downtime (HV, DAQ, Trigger, Level3, etc etc)
- Downtime logger category names
  - www-cdfonline.fnal.gov/acnet/downtime_names.html
- VERY important to categorize downtime according to the underlying cause. (Just because the DAQ system stops taking data doesn't mean DAQ is the cause.)
- Allows for downtime accounting later

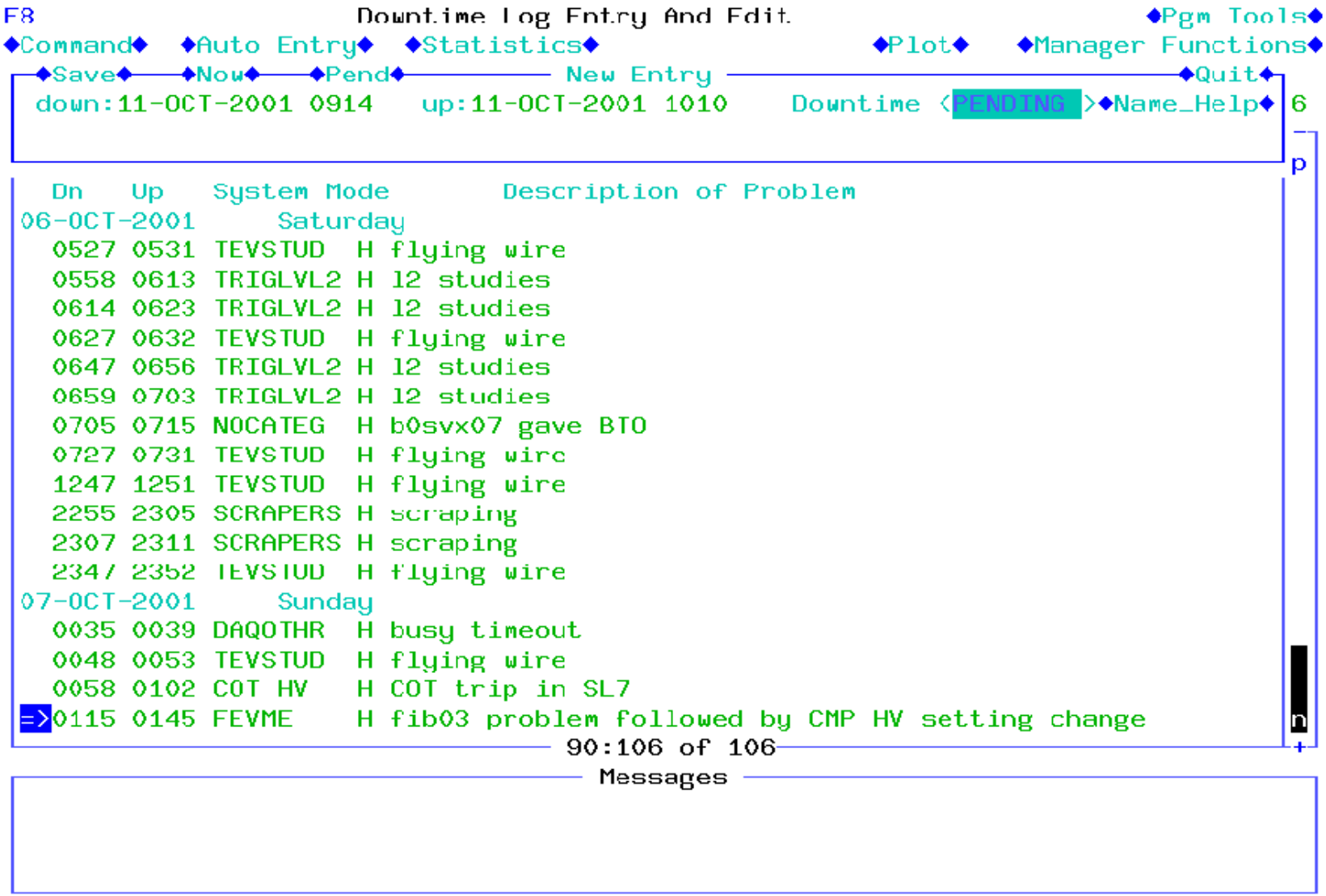
Page E8 - CDF Downtime data Logger



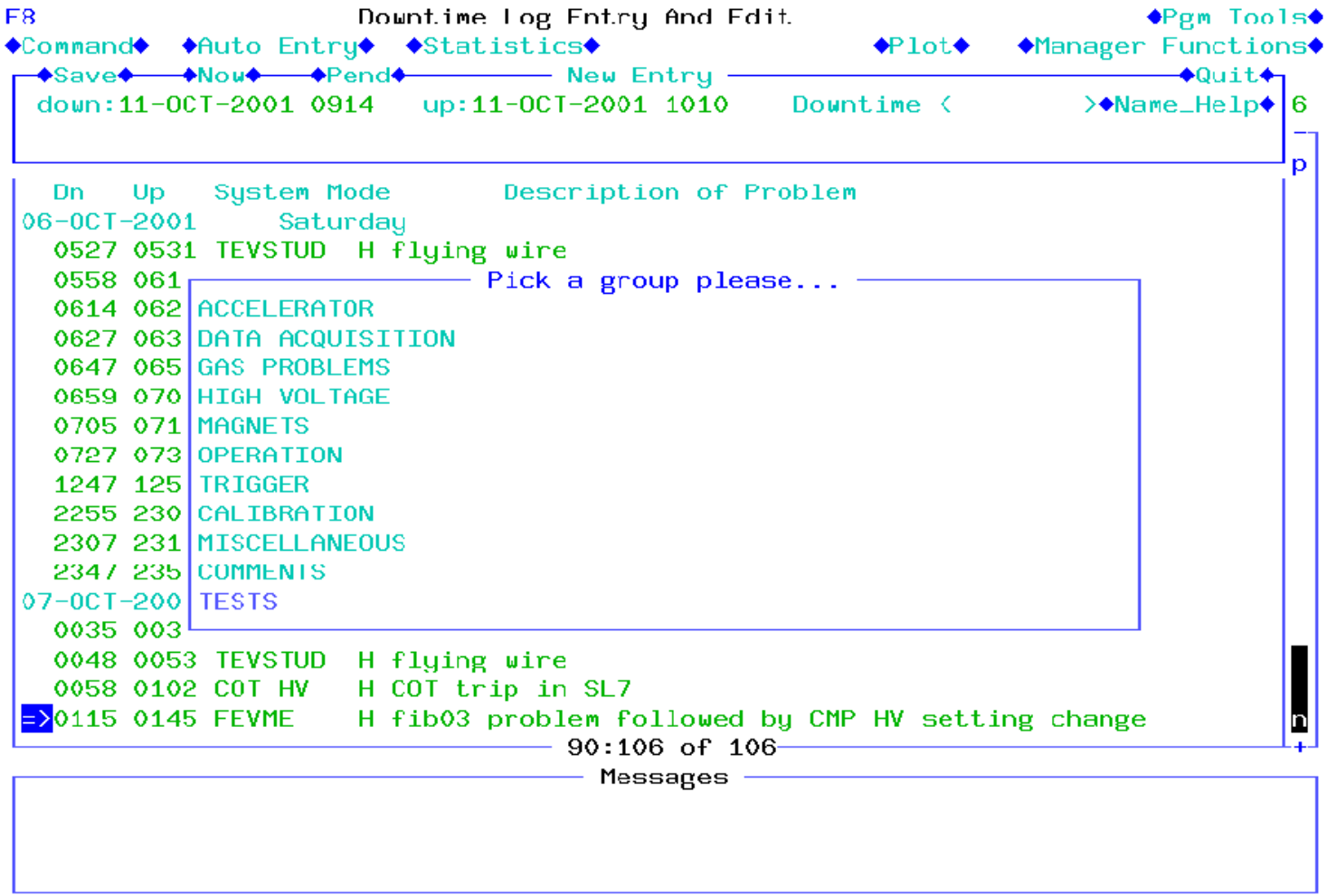
Click AUTO ENTRY to bring up pending entries



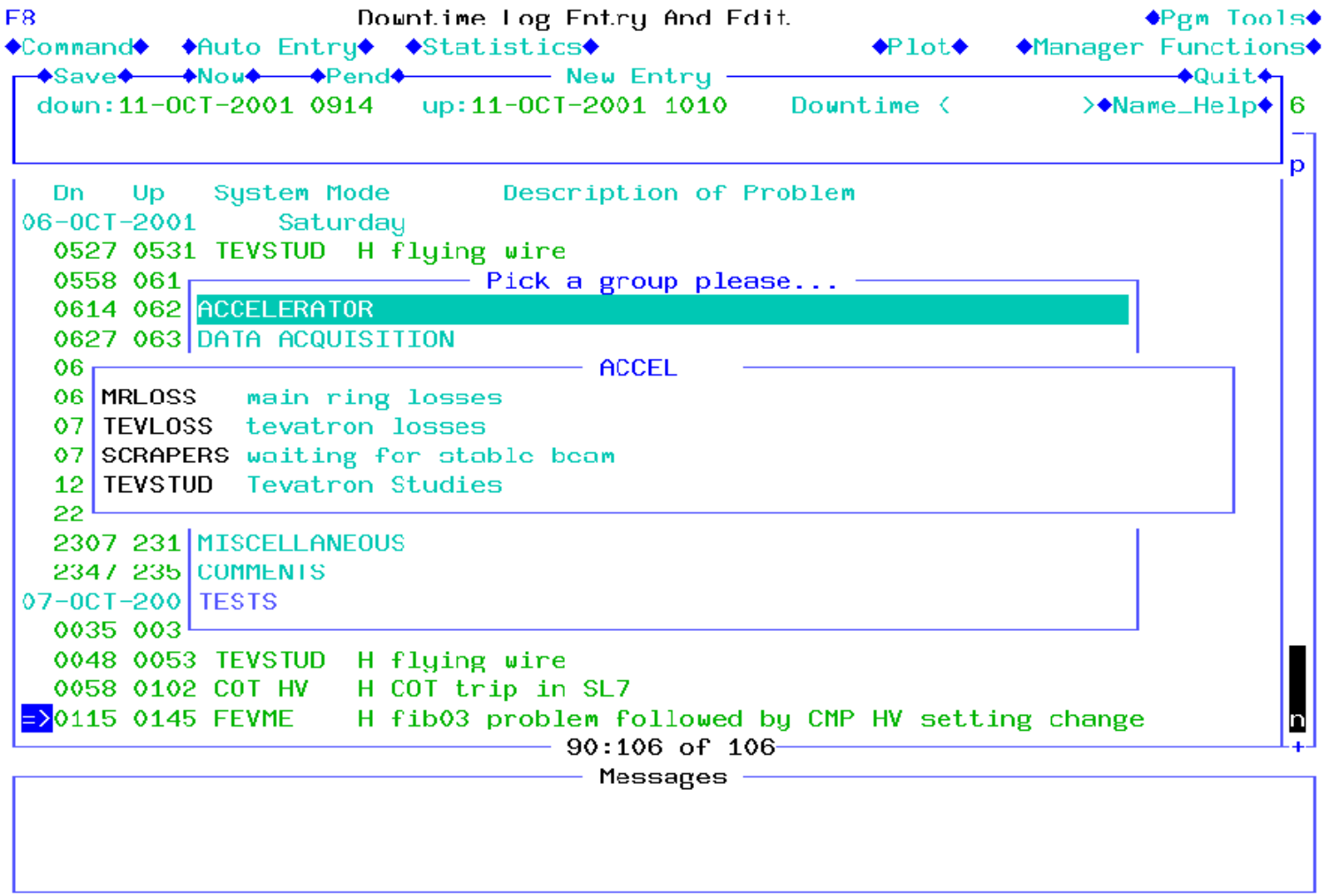
Click ADD and choose an entry from the list



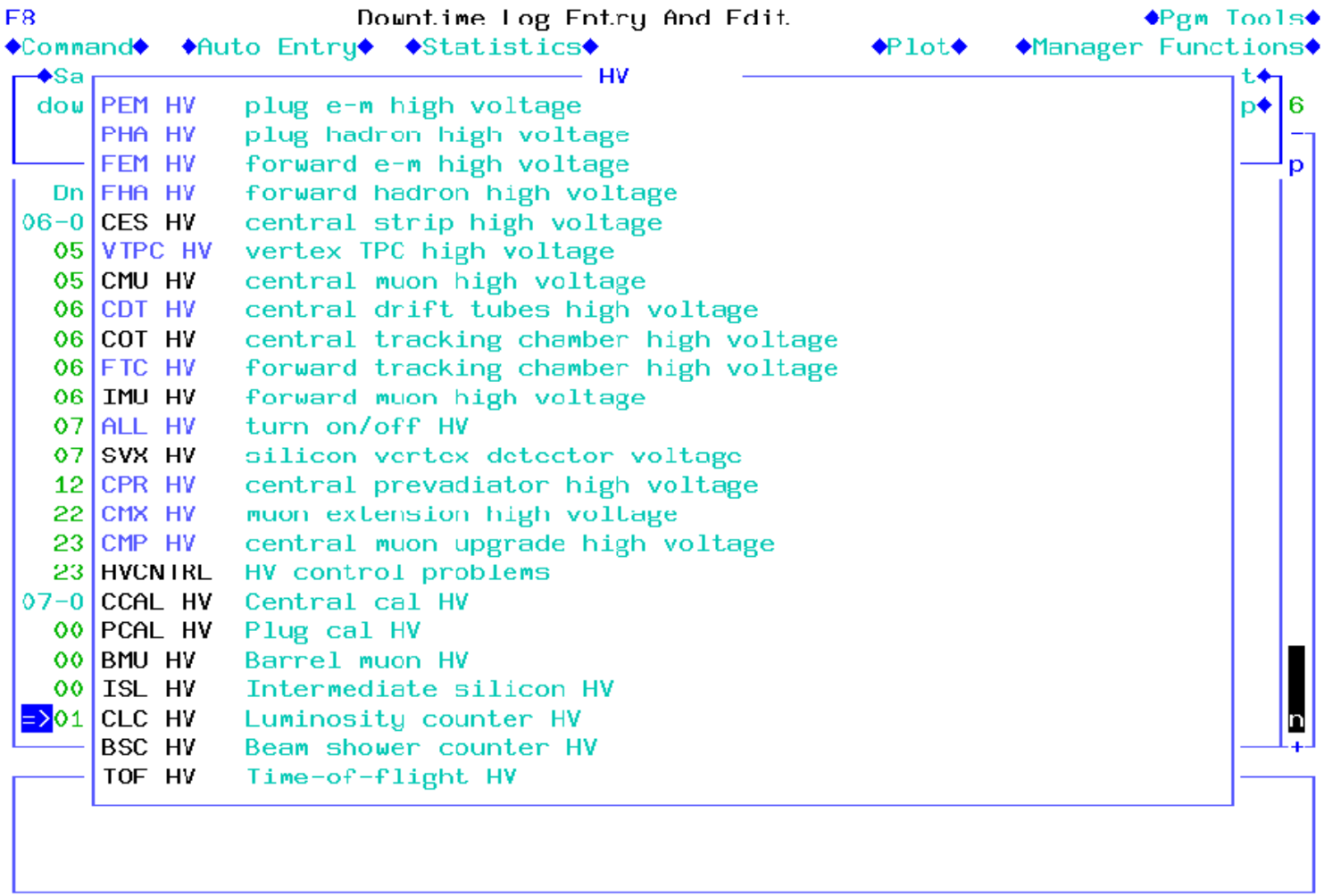
Click NAME HELP to list the major categories.
Click on category to get a list of subcategories.



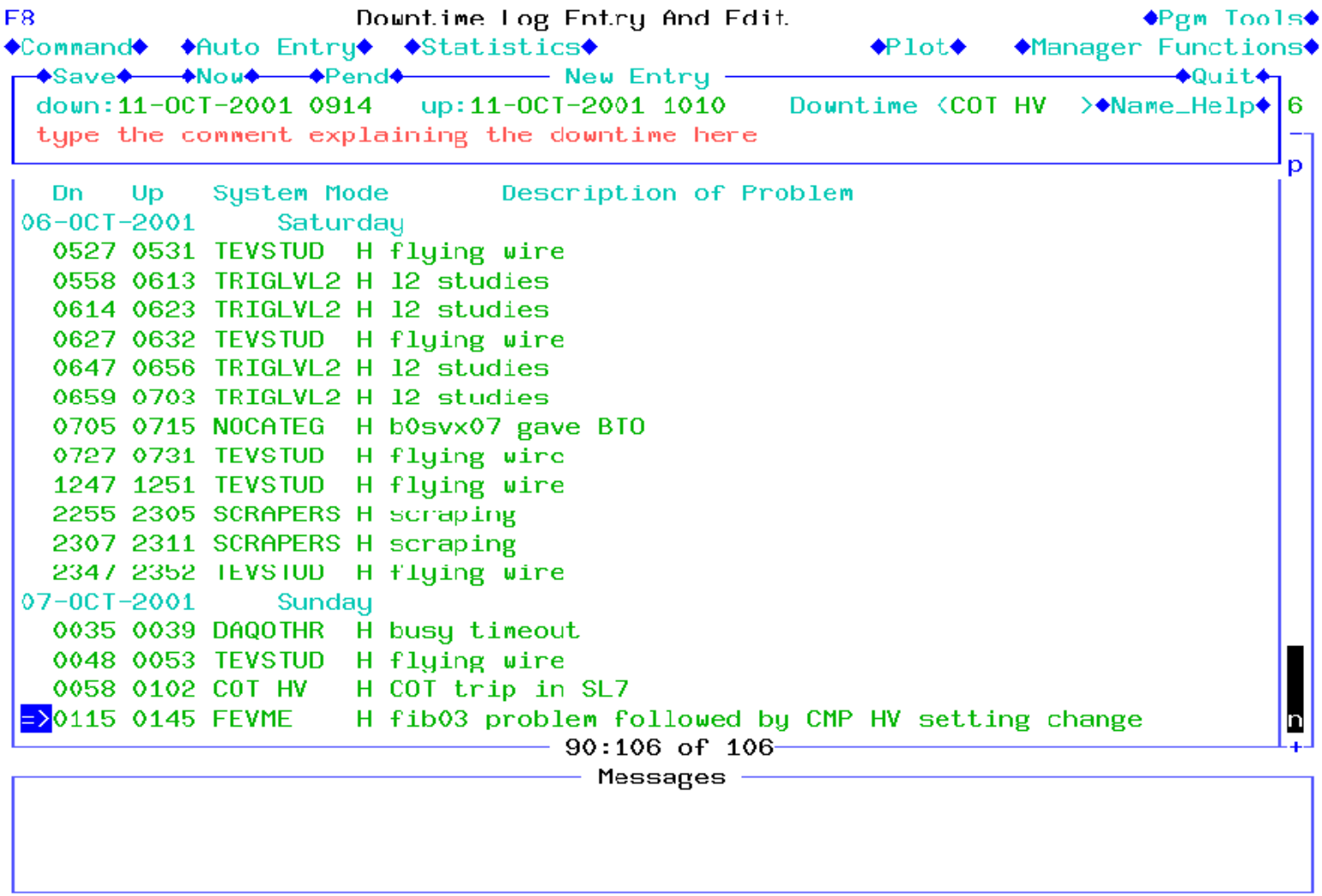
Possible categories under ACCELERATOR. Click on one to copy it to the DOWNTIME field.



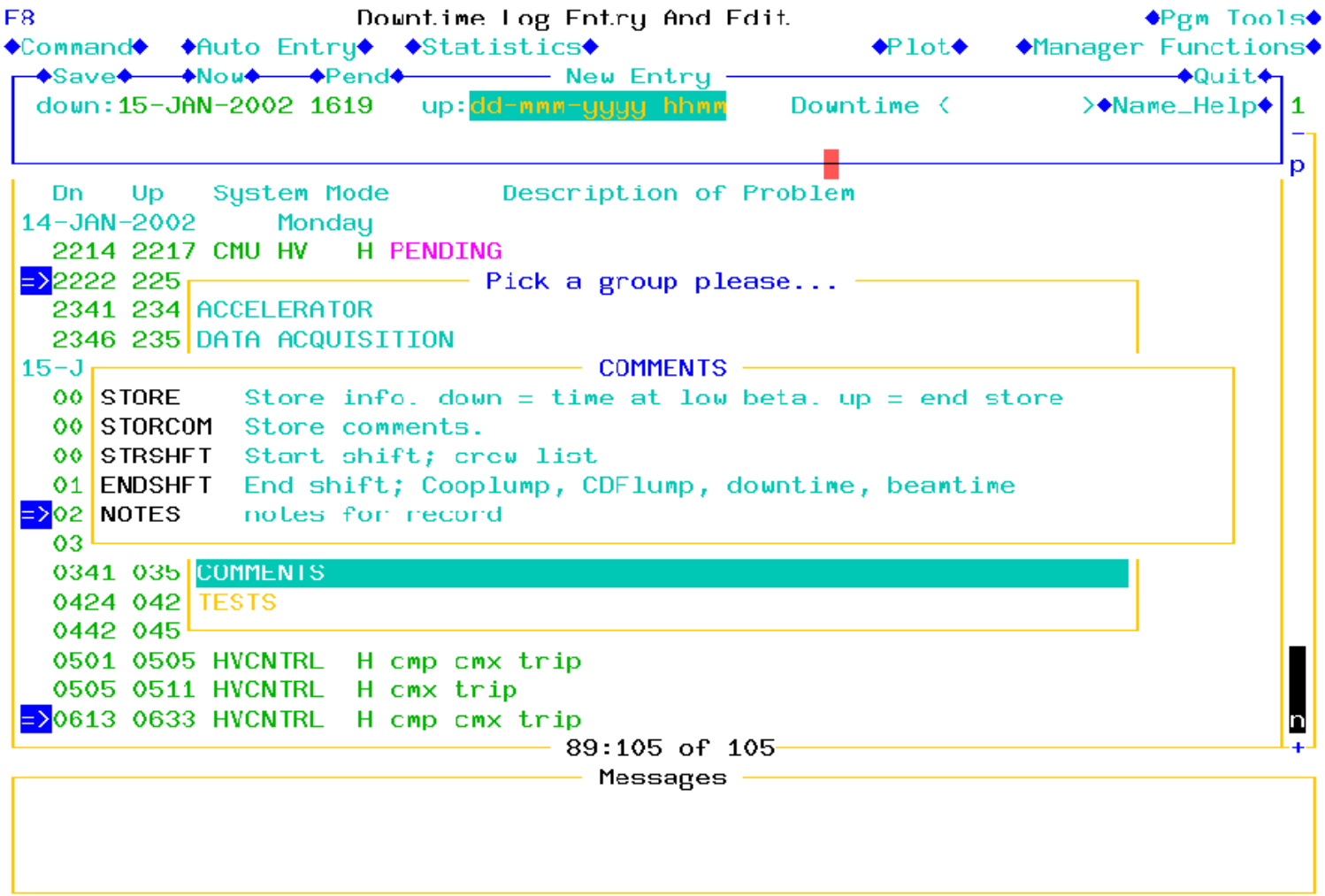
Possible categories under HV.
Click on one to copy it to the DOWNTIME field.



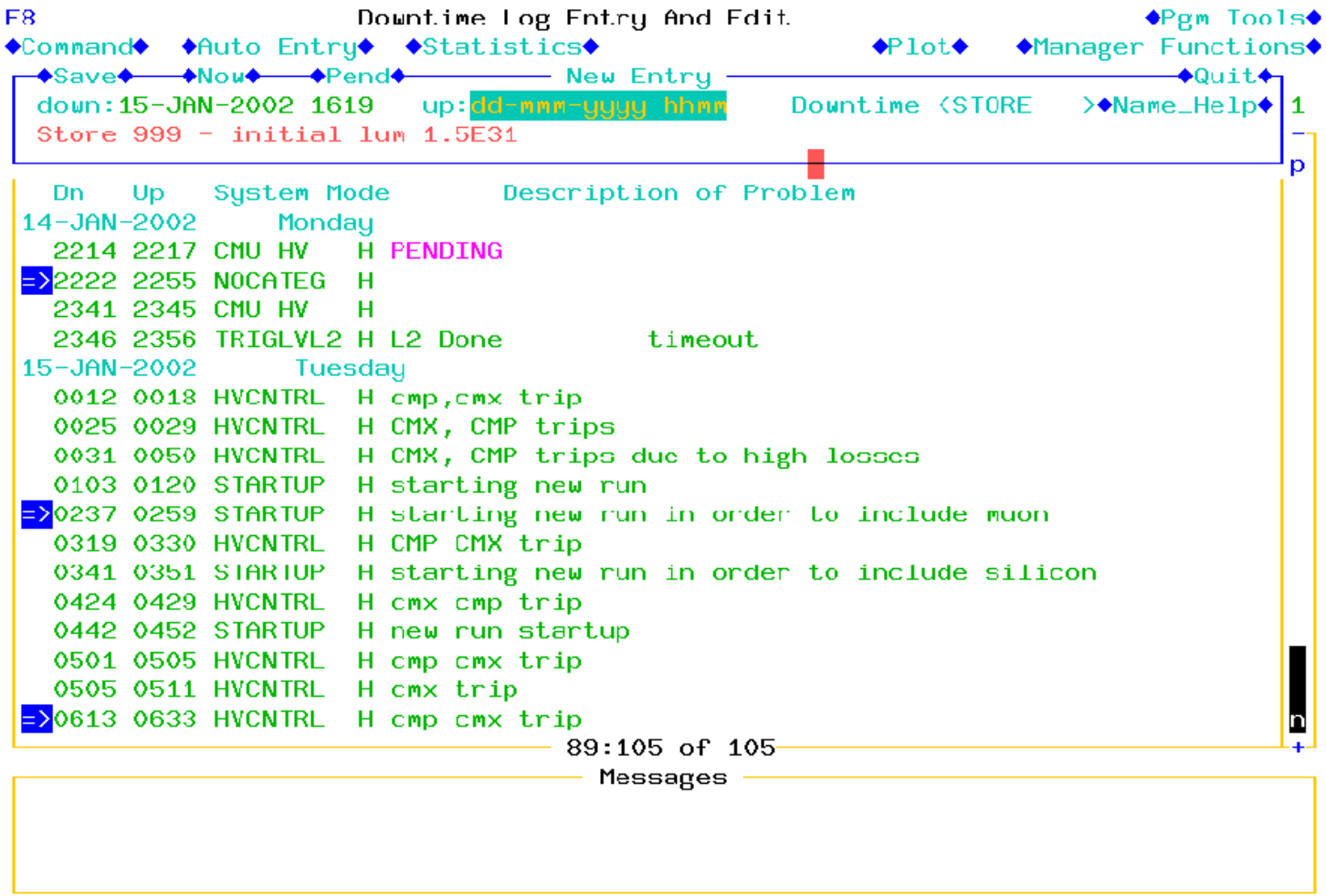
Type in comment then click SAVE to commit the new entry



When a new store goes in, enter as COMMENT. Not an auto entry, so use ADD ENTRY



DOWN time is when scraping is complete (t_0 for start of the store). Fill the UP time at the end of store. COMMENT should include store # and initial luminosity.



ACNET resources

http://www-cdfonline.fnal.gov/acnet/acnet.html

Web Tutorials by John Yoh, et al.

- www-cdfonline.fnal.gov/acnet/acnetplots.html
- 4 *fresh and exciting* tutorials.

Aces' Shift ACNET Plots

- www-cdfonline.fnal.gov/acnetplots/acnet.html -

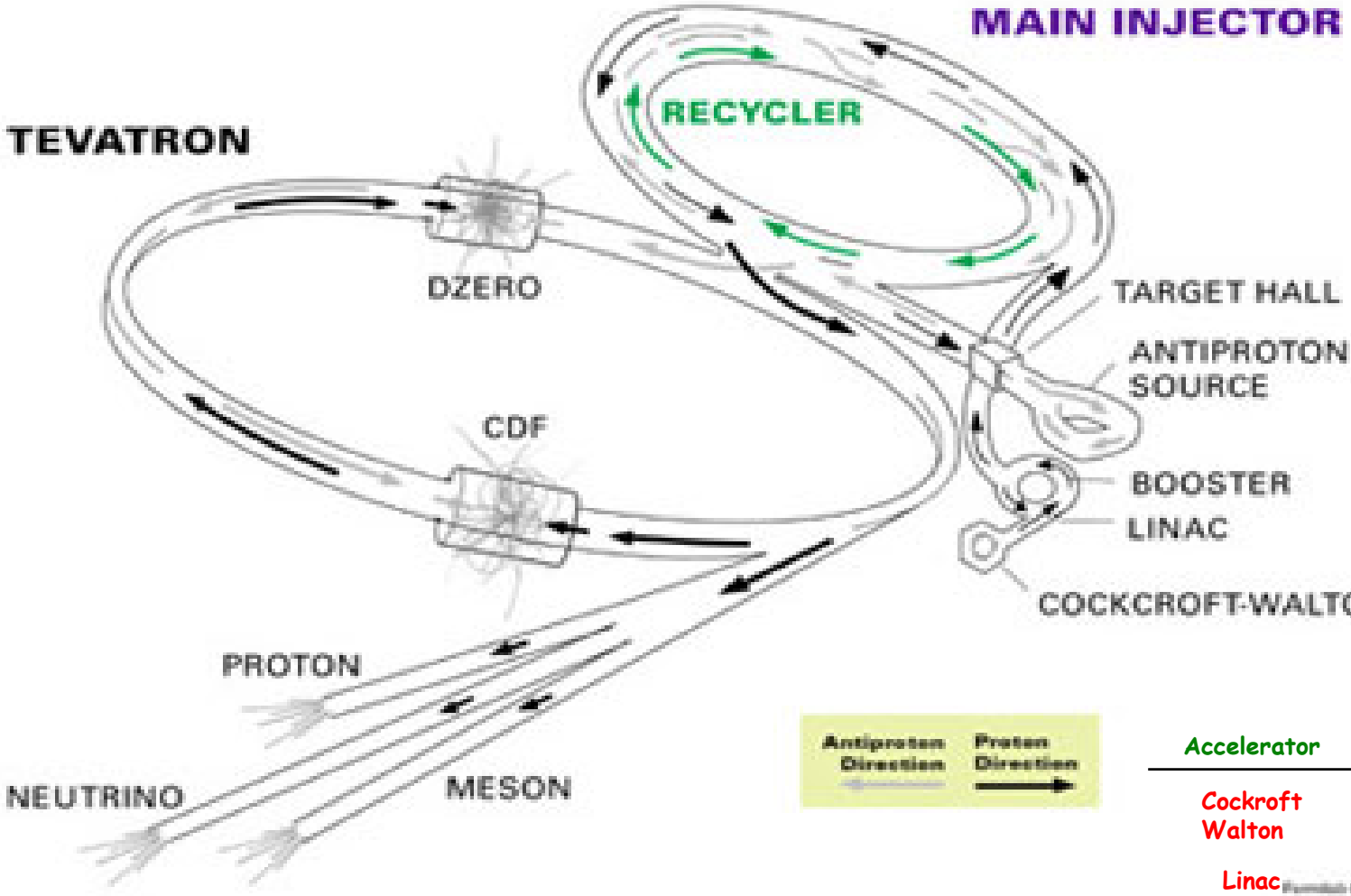
Accelerator Division Web Pages

- www-bd.fnal.gov/acnet/
- Information about all acnet pages

Shift crew resources:

- **Bug your overlap ACE buddy, operations manager, JJ, and Steve Hahn !**

SHOT SETUP



Accelerator	Energy
Cockroft Walton	750 keV
Linac	400 Mev
Booster	8 GeV
Main injector	150 GeV
TEVATRON	980 GeV

Shot Setup Terminology

- **Stacking** – Production and collection of antiprotons into the Accumulator. This operation can take place independent of the Tevatron.
- **Shot Setup** – the sequence of events leading to antiproton shots. Typically takes about 2 hours. Ideally would take much less.
- **Shot** – the injection of antiprotons from the Accumulator into the Main Injector and on into the Tevatron in preparation for colliding beams operation.
- **Store** – when there is a steady p, pbar beam present in the Tevatron
  - Numbered sequentially
  - Typically lasts 12-24 hours
  - Can sometimes end abruptly
- In the best of times, CDF takes data continually with a 1-2 hour break once a day to end a store, take some calibrations, and start the next store.

Shot Setup Overview

- At the end of a store:
  - The Main Control Room (MCR) should notify CDF in advance of planned beam dumps.
  - End data taking run
  - Before the store is dumped, ramp down high voltage (allow 5 minutes)
  - SciCo notifies MCR that CDF is ready for store to be terminated.

Shot setup checklist

- **Shot Setup Checklist** is comprehensive set of instructions to follow in preparation for a shot and data taking. The **Checklist** also has brief instructions on what the Monitoring Ace does during a store and at end of a store.
- **Special Instructions** – ***Always*** check the "White Board" for exceptions and special instructions to follow.
- Current version of checklist is linked from DAQ Ace help page. Please tell Ops Manager, JJ, and Kaori about anything that is confusing in the checklist or anything that needs updating.
- **Shot Setup Flowchart** helps DAQ Ace minimize lost beam time during startup.

Shot setup checklist

Please print out at least one copy at beginning of every shot setup.

CDF Shot Setup Checklist v2.8

date_____ Store#_____

http://www-cdfonline.fnal.gov/opshelp/ShotSetupChecklist_v28.html
Revised 16 June-2003

Instructions:

- Use this checklist during shot setup. File completed this form in a Shot Setup folder.
- Record entries in the shift elog.
- Recording times in the boxes is useful when communicating information during shift changes.

1) Before a store (Many steps can be performed simultaneously.)

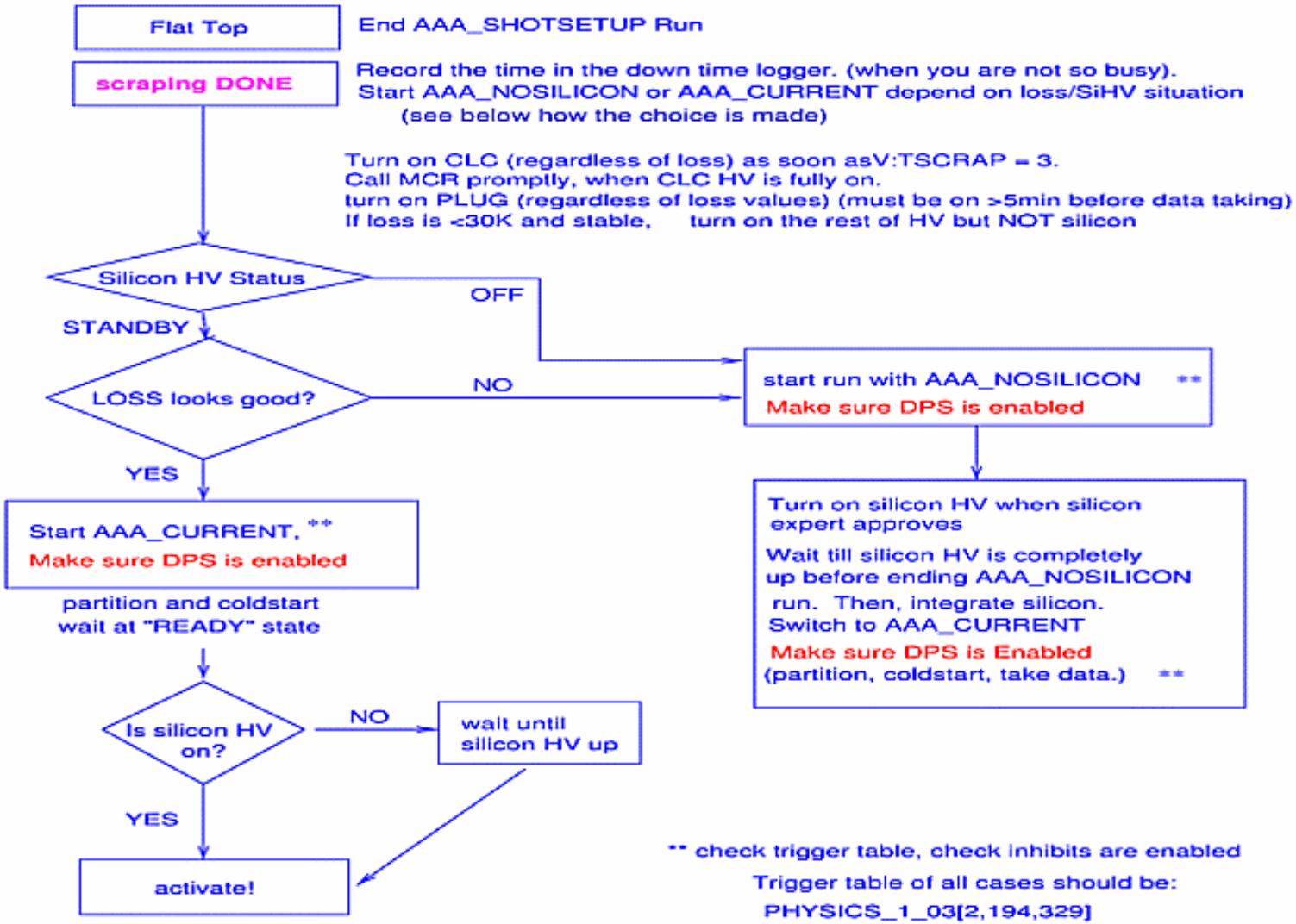
Etc...

www-cdfonline.fnal.gov/opshelp/shotsetup_flow.ps

shotsetup flow chart (with Silicon)

* when antiproton loading starts, page silicon (218-8227)
* should be running AAA_SHOTSETUP run.

DPS (dynamic prescale) should be ENABLED for all physics runs.
Auto HRR should be ENABLED for all physics runs from the Error Handler GUI.



** check trigger table, check inhibits are enabled
Trigger table of all cases should be:
PHYSICS_1_03[2,194,329]

Last update: Dec. 13 2002. Kaori

What to watch in ACNET

When the shot is going in…

C:BOPLOS B0 proton losses from BSC (Hz)
C:BOALOS B0 pbar losses from BSC (Hz)
C:LOSTP - proton losses fast response (Hz)
C:LOSTPB- pbar losses fast response (Hz)
C:BOILUM - B0 delivered instantaneous luminosity (E30 cm^{-2} s^{-1})
C:BOQ5 - Current in low beta quads (Amps)
T:ERING - Tevatron energy (GeV)
T:IBEAM - Tevatron beam current (E12)
E:SVRAD(0-3) – SVX integrated radiation dose (rad)
E:SVBLA(0,1), SVBLB(0,1) – SVX instantaneous rates (rad/s)

Andy Hocker will talk about Silicon radiation monitoring in Thursday's training session.

During the store also monitor…

C:BOILUM – Delivered instantaneous luminosity (E30 cm^{-2} s^{-1})
C:BOLLUM - Live instantaneous luminosity (E30 cm^{-2} s^{-1})
C:BOTLUM - Integrated delivered luminosity (nb^{-1})
C:BOTLIV - integrated live luminosity(nb^{-1})

What to watch in ACNET

To measure losses in silicon detectors

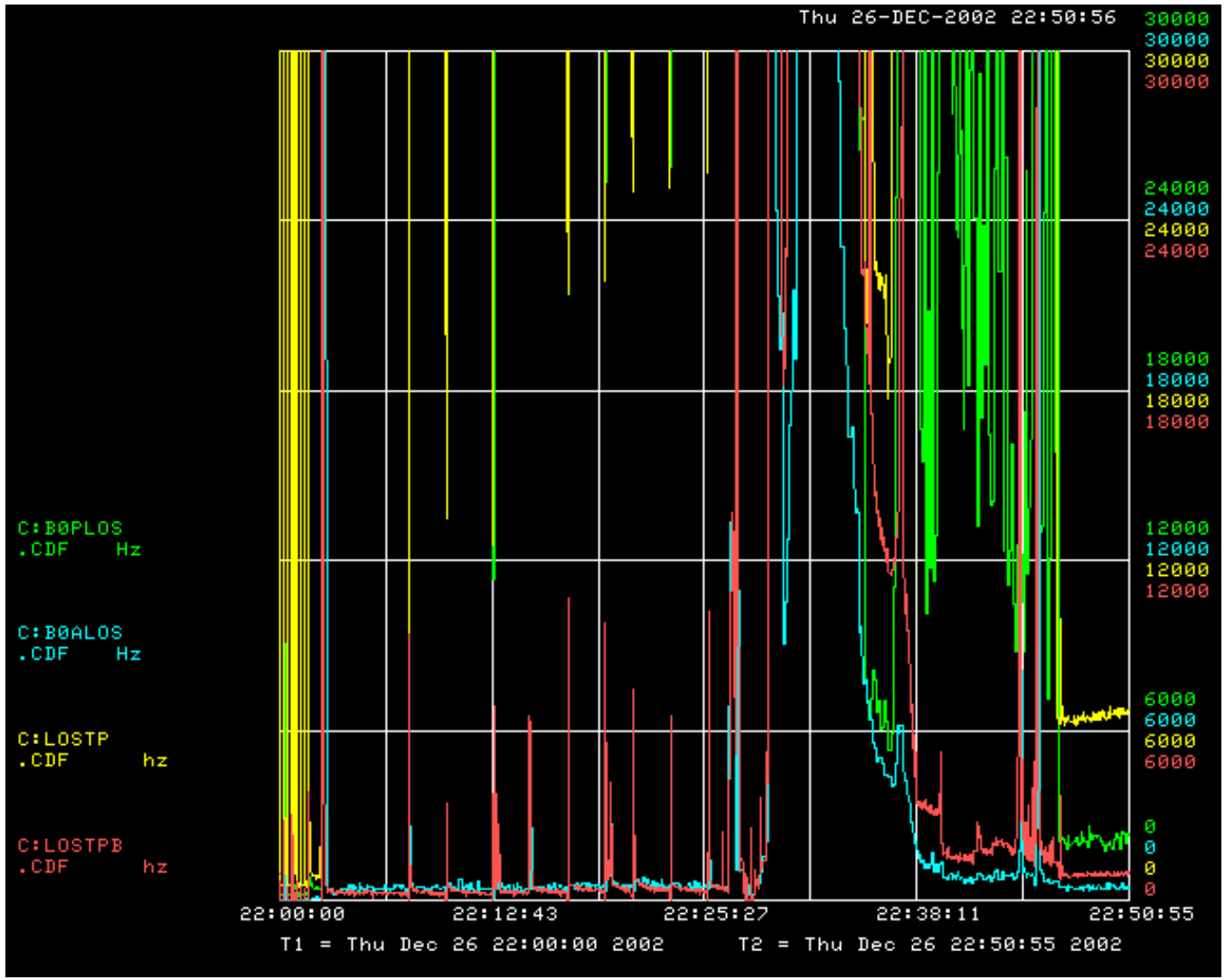
E:SVRAD0 – west inner BLM integrated radiation dose (rad)
E:SVRAD1 – west outer BLM integrated radiation dose (rad)
E:SVRAD2 – east inner BLM integrated radiation dose (rad)
E:SVRAD3 – east outer BLM integrated radiation dose (rad)

E:SVBLA1 – west inner BLM instantaneous loss rate (rad/s)
E:SVBLA2 – west outer BLM instantaneous loss rate (rad/s)
E:SVBLB1 – east inner BLM instantaneous loss rate (rad/s)
E:SVBLB2 – east outer BLM instantaneous loss rate (rad/s)

Acnet page E2 allows you to monitor the current values of the instantaneous and integrated dose rates

Store 2105: losses during shot setup
(ACNET page E11 E-Z writer)

C:B0PLOS
C:B0ALOS
C:LOSTP
C:LOSTPB



Resources

Shot setup checklist:

www-cdfonline.fnal.gov/opshelp/ShotSetupChecklist_current.html

Shot setup flowchart:

www-cdfonline.fnal.gov/opshelp/shotsetup_flow.ps

Helpful Beams Info:

www-bdnew.fnal.gov/operations/rookie_books/rbooks.html

www-bd.fnal.gov/runII/index.html